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ABSTRACT

A study was conducted to examine two methods of presentation of social studies questions used in teaching selected concepts to second-grade children and to determine which method was more effective as reflected in the achievement demonstrated by the subjects. The procedure used was a 3x2x2 (Treatment by Sex by School Location) fixed-effects factorial design to test the hypothesis that if second-grade children instructed with two methods of question presentation are compared with children receiving regular classroom instruction, then a significant difference in social studies achievement will result in favor of the experimental groups. The experimental groups were instructed for a six-week period. The instructional sequences were three weeks in length: one on the concept rules and the other on concept location. Results of data analysis showed the following differences: (1) Children instructed with predominantly higher-level questions performed at significantly higher levels regardless of method of question presentation than did children receiving regular classroom instruction; (2) Children using non-reading materials for question presentation achieved significantly higher levels than did children using reading materials; (3) Children from the suburban school demonstrated higher achievement than children from the urban school. Conclusions include: (1) Oral presentation of instructional questions in social studies materials for second-grade children resulted in higher achievement levels on the part of the learners than did written presentation; (2) Social studies achievement was not affected by the sex of the pupils; (3) No interactions occurred between the variables of sex and among the variables of treatment, sex, and school location. (Author/CK)

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A STUDY OF THE RELATIONSHIP OF TWO METHODS OF QUESTION PRESENTATION, SEX, AND SCHOOL LOCATION TO THE SOCIAL STUDIES ACHIEVEMENT OF SECOND-GRADE CHILDREN

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The relationship of teachers' instructional questions to learners' achievement is a problem encompassing several aspects. This study was one of three independent but companion studies that were undertaken to examine related aspects of this problem. The experiment investigated the relationship of two methods of question presentation using predominantly higher-level questions as defined by Bloom's Taxonomy (1956) to the social studies achievement of second-grade children. Pupils in one treatment group were required to respond to questions read to them by the teacher; pupils in a second treatment group were required to read the questions for themselves prior to responding. Visual stimuli were used as the focus for questioning in both groups.

Two companion studies examined the relationship of varied levels of questioning to the social studies achievement of children. These studies were "A Study of the Relationship of Classroom Questions and Social Studies Achievement of Second-Grade Children" by L. JoAnne Buggey and " A Study of the Relationship of Classroom Questions and Social Studies Achievement of Fifth-Grade Children" by Tom Savage. In both studies, one treatment group was instructed with predominantly knowledge-level questions, and the other treatment group was instructed with predominantly higher-level questions. In the two studies, pupils were required to respond to questions read to them by the teacher. The same visual stimuli were used as the focus for questions in the companion studies as were used in the present investigation.

The importance of questioning as an instructional strategy has received increasing emphasis from educators in the past decade. Although questions have been recognized since ancient times as endemic to the teaching-learning process, little scientific effort has been made to examine the effects of teachers' instructional questions on learners' achievement. If the objectives of education stress the acquisition of intellectual skills and abilities requiring higher cognitive processes, then the kinds of questions utilized by teachers should reflect these goals. If higher levels of teacher questioning behavior can be obtained, then it is necessary for educators to determine the most effective presentation of questions in order to stimulate children's responses most productively.

The Problem

It was the purpose of this study to examine two methods of presentation of social studies questions used in teaching selected concepts to second-grade children and to determine which method was more effective as reflected in the achievement demonstrated by the

subjects. Consonant with current social studies textbooks, the questions were predominantly higher-level in order to encourage higher cognitive processes: each presentation contained thirty per cent knowledge-level questions and seventy per cent higher-level questions.

The study made by Hunkins (1966) of the effects of controlled levels of questioning on the achievement of pupils is the major basis for this experiment. He concluded that sixth-grade children exhibited a higher level of social studies achievement if taught with materials stressing analysis and evaluation questions rather than knowledge questions. Although Hunkins devised a criterion test that included questions from all levels of Bloom's Taxonomy, primarily knowledge, analysis, and evaluation questions were used in the instructional sequence. In order to allow the learners to practice responding to higher-level questions prior to measurement of their ability to answer such questions, this study provided questions representative of all levels of the Taxonomy in all teaching materials.

Hunkins initially found that reading ability was distributed randomly throughout his sample and did not use it as a covariant. He reported, however, that reading ability was a significant factor in the pupil's ability to answer higher-level quesions. This segment of the study was planned as a result of his conclusion that a pupil who did not read well would not respond as well to higher-level questions. The two methods of instruction selected examined the question of whether elimination of the necessity to read the instructional materials would allow pupils to demonstrate higher levels of achievement.

A third factor raised by Hunkins for further research was an examination of the effect of teacher-pupil discussion on the achievement of children. In his study, he presented the pupils with special worksheets that were used in conjunction with a standard sixth-grade social studies textbook. All work was done independently by each pupil; normal classroom discussion of questions and responses was eliminated. In the present experiment, however, teacher-pupil interaction resulted from each question regardless of the method used to present the questions.

Three other considerations for this study were drawn from Hunkins' work. He found that there were no significant differences in achievement that could be attributed to the sex variable; however, interactions between sex and treatment were found for some higher-level questions in later analysis of the data (1968). As a result of his findings, this investigator included sex as a factor. He also suggested that research be done at other grade levels and with other populations. While his examination was limited to suburban sixth-grade pupils, this study examined the achievement of both urban and suburban second-grade pupils. Hunkins also suggested that a longer time period might yield different results. An instructional period of six weeks, two weeks longer than his work, was selected for this investigation.

In order to examine the problem proposed for this experiment, the following major research hypothesis was tested.

If second-grade children instructed with two methods of question presentation are compared with children receiving regular classroom instruction, then a significant difference in social studies achievement will result in favor of the experimental groups.

a. If children instructed with non-reading materials using thirty per cent knowledge-level questions and seventy per cent higher-level questions are compared with children receiving regular classroom instruction, then a significant difference in achievement will result in favor of the experimental group.

b. If children instructed with reading materials using thirty per cent knowledge-level questions and seventy per cent higher-level questions are compared with children receiving regular classroom instruction, then a significant difference in achievement will result in favor of the experimental group.

c. If children instructed with non-reading materials are compared with children instructed with reading materials, both groups using thirty per cent knowledge-level questions and seventy per cent higher-level questions, then a significant difference in achievement will result in favor of the non-reading group.

Six secondary hypotheses examined the variables of sex and school location and the possible interactions among these variables.

Experimental Procedures

The experimenter selected a 3x2x2 (Treatment by Sex by School Location) fixed-effects factorial design to test the hypotheses. A Posttest Only, Control Group procedure was used. The design is explained in Table I. The sample consisted of one hundred twenty subjects encompassing the entire second-grade population of two randomly selected schools within the Seattle Standard Metropolitan Statistical Area, one urban and one suburban. The populations from which each school drew its pupils were equated on five criteria based on the most recent Census Tracts data: (1) income, (2) number of school years completed per adult, (3) population per household, (4) value per housing unit, and (5) per cent white collar workers (Table II). The pupils were assigned randomly to one of three groups, and each group was assigned randomly to a treatment condition.

The experimental groups were instructed for a six-week period. The instructional sequences were three weeks in length: one on the concept rules and the other on the concept location. Treatment A pupils responded to a series of questions read to them by the teacher. Treatment B pupils responded to a series of questions read silently from a text format. Both groups responded to the same questions containing a distribution of thirty per cent knowledge-level questions and seventy per cent higher-level questions. Both groups

focused on a series of visual materials as the stimulus for questioning. All pupils responded orally and engaged in normal class discussion after each question. The Control Group continued with regular classroom instruction unrelated to the experimental concepts during the period of the study.

The dependent measure of achievement was a criterion instrument developed by the experimenters for the larger investigation. It consisted of two parts, one for the concept rules and one for the concept location. Each subtest contained thirty questions, five questions from each of the six levels of the Taxonomy. To prevent reading from becoming an intervening variable in measuring achievement, the test was pictorial in nature and required no reading on the part of the learners. All questions for both the instructional sequences and the criterion test were categorized by a panel of three judges. Interobserver reliability was found to be .92. The test instrument was evaluated by the Kuder-Richardson Formula 20 and a reliability coefficient of .84 was obtained. At the end of each three-week instructional sequence, the appropriate subtest was administered to all subjects. The combined score on the two subtests was used as the measure of each pupil's performance.

Findings

The data gathered from this investigation were analyzed according to analysis of variance statistical techniques. A confidence level of .05 was set for the rejection of the null hypotheses. The Newman-Keuls Test was used to analyze the differences within the treatment main effect. The raw scores of the achievement test are summarized in Table III. Tables IV and V provide the data that resulted from the analysis of variance and the Newman-Keuls Test. Since two interactions were also obtained, these are graphed in Plates I and II.

The results of the statistical techniques showed the following significant differences. Children instructed with predominantly higher-level questions performed at significantly higher levels regardless of method of question presentation than did children receiving regular classroom instruction. Children using non-reading materials for question presentation achieved at significantly higher levels than did children using reading materials for question presentation. Children from the suburban school demonstrated higher achievement than children from the urban school. Significant interactions were found between treatment and school location and between sex and school location. No significant effect on achievement was found that could be attributed to sex differences. No other significant interactions between and among the variables were found.

Conclusions

Several conclusions were drawn by the investigator as a result of the findings of the experiment and their application to the research hypotheses.

1. Oral presentation of instructional questions in social studies materials for second-grade children resulted in higher levels of achievment on the part of the learners than did written presentation of instructional questions.

2. Second-grade children from a suburban school demonstrated higher levels of achievement in social studies based on instructional sequences utilizing predominantly higher-level questions than did second-grade children from an urban school, even though both groups came from a similar socio-economic background.

3. Social studies achievement of second-grade children based on instruction using questioning strategies was not affected by the sex of the pupils.

4. The social studies achievement of second-grade urban children was more affected by the written presentation of instructional questions than was the social studies achievement of second-grade suburban children.

5. Urban second-grade boys demonstrated lower levels of social studies achievement than urban second-grade girls, but both urban groups achieved at lower levels than second-grade suburban pupils.

6. No interactions occurred between the variables of treatment and sex or among the variables of treatment, sex, and school location based on the results of this experiment.

The most significant conclusion was that an oral presentation of instructional questions in social studies was more effective with second-grade children than a written presentation of these questions. Four reasons might account for this result. First, primary-grade children have had limited reading instruction. Those learners with reading difficulties were not penalized by the oral presentation of questions. The elimination of the reading variable in both instruction and testing allowed each pupil equal opportunity to demonstrate achievement. A second reason could be the large visuals used as the questioning stimuli served to focus the pupils' attention on the concepts being taught. A third reason advanced is that the attention of the pupils is commanded by the teacher when asking the question; this maintains involvement of the learners in the instructional sequence. Fourth, the use of predominantly higher-level questions in instruction aided the children in responding to achievement testing that demanded answers at the higher levels of cognition. Exposure to all levels of the Taxonomy probably had a practice effect for the children. This conclusion supports the research literature that reading can affect school achievement. Hunkins' earlier study indicating that reading was an intervening variable in the ability of pupils to respond to higher-level questions was also supported.

The second conclusion that suburban children achieved at higher levels than urban children is more difficult to explain. At the time of this study, the research literature failed to include studies that examined the variable of school location if the socio-economic level of the pupils was controlled. Three possible explanations are suggested for this conclusion. It seems probable that the suburban school setting was more conducive to the pupils' understanding of the instructional techniques used in the study. A second

factor might have been the prior instruction received by the two groups. The urban children were involved in a computerized, individualized program that did not permit much teacher-pupil interaction. This fact may have been advantageous to the suburban children instructed in a conventional classroom setting. A third possibility is that the situations selected to teach the concepts were not as appealing to the urban child as to the suburban child. Although integrated and urban settings were used for much of the instructional focus, these may not have been relevant for the learners in the urban situation. The relationship of school location if socio-economic level is controlled to the achievement of learners remains unclear; further exploration of this topic is needed.

Sex was not found to be a significant variable in this study. This conclusion supports the previous work of Hunkins. It does not diminish the confusion in the literature on this topic, however. Girls are superior to boys in reading achievement according to available research. This factor was negated in the present experiment. This might be explained by the fact that the interaction after each question allowed the boys to compensate for their poorer reading ability. It is also possible that the visual achievement test aided the boys in overcoming their initial disadvantage.

Two significant interactions were found in this experiment. These occurred between the variables of treatment and school location and between the variables of sex and school location. Although both the urban and the suburban children demonstrated lower levels of achievement when instructed with the written question presentation, the urban children were more affected by the differences in treatment condition. The second interaction is related to the first; boys in the urban school achieved at significantly lower levels than girls in the urban school, although both urban groups performed less well than the suburban groups. The explanation of these interactions seems to be the same for both. The performance of the urban boys was sufficient to create these interactions. The scores in the one cell for urban boys in Treatment Group B are responsible. Most of the subjects in this treatment group did not complete the last page of either subtest of the criterion measure. The resultant loss of points for each boy, one-sixth of his total score, was sufficient to create a significant difference. One possible explanation is that the boys did not have an attention span of twenty-five minutes in order to complete the test. Further exploration of the reasons why the boys did not finish the test is needed.

Since no other interactions were found, the other variables apparently operated independently of each other in this segment of the study. Treatment condition and sex and school location are not necessarily operating concurrently in all situations.

Implications

Implicit in the conclusions of this experiment are several guidelines for the use of the questioning strategy in the instruction of second-grade pupils. These are the use of predominantly higher-level questions by classroom teachers, the verbal presentation of instructional questions, the use of Bloom's Taxonomy as a guide in

question and test construction, the use of a combination of large visuals and oral question presentation, the use of reading-free test instruments, and the need for individualization of instructional presentation.

The assumption that higher-level questioning behavior by teachers can improve pupil achievement is common in the literature and is supported by this study. If primary-grade teachers are to effectively improve the cognition of their pupils at higher levels, they must utilize predominantly higher-level questions in instructional sequences. The necessary change in teacher behavior can be accomplished in several ways.

Institutions responsible for teacher preparation must recognize the necessity to provide both awareness of the nature of higher-level questions and experiences that require the prospective teachers to construct and use such questions. Efforts by curriculum personnel and educational publishers can also aid in effecting change in teacher behavior. Curriculum coordinators need to plan inservice programs that will prepare present classroom teachers to use higher-level questioning sequences with their pupils and to incorporate such questions in curriculum guides. They can also encourage the use of materials that utilize higher-level questions to stimulate thinking. Educational publishers need to continue the trend towards predominantly higher-level questions in texts and teacher's materials for primary grades.

The verbal presentation of instructional questions to second-grade children would seem to be preferable to written presentation based on this study. Social studies methods courses and inservice education programs can provide opportunities for designing and implementing oral questioning sequences with pupils. Educators in urban schools particularly should strive for this form of presentation to their learners in order to encourage higher-level thinking processes. Publishers should suggest that teachers read questions to pupils rather than ask them to read for themselves.

The application of the Taxonomy to question construction for both instruction and evaluation in social studies should be encouraged. Preservice and inservice education should provide opportunities for participants to become familiar with the heirarchy and to understand its use in teaching and evaluating learners. Sufficient practice in question construction must be incorporated if teachers are to master the use of the Taxonomy.

The use of large visuals combined with question scripts appears to be desirable for primary children. Publishers and classroom teachers should develop materials of this type for use with children in order to aid both in concept development and in higher-level thinking.

It is necessary to provide additional evaluative instruments for primary children that do not require them to read. Through inservice workshops and social studies methods courses, teachers should obtain practice in developing non-verbal tests. The major responsibility for development of pictorial instruments, however, rests with educational publishers. They need to provide reading-free tests for texts and other materials. The development of evaluative

instruments that do not penalize the poorer reader will aid both urban and suburban teachers in measuring achievement.

Teachers need to consider differentiated methods of question presentation for students in their classes. The use of taped questions accompanying textual materials is one way for the teacher to individualize. Less reliance needs to be placed on formal text materials for primary children. Self-instructional packets developed by the publishers would be a valuable contribution.

Several possibilities for further research are raised by the results of this experiment. Further analysis of the data and comparison with the companion studies would be valuable. Replication of the study at other grade levels would allow evaluation of the methods of question presentation with more mature learners.

The researcher could manipulate the experimental conditions in order to determine if this would affect achievement. The use of different concepts would permit examination of content as a means of stimulating achievement. The use of different proportions of knowledge-level and higher-level questions would allow further exploration of the most efficacious distribution of questions. The use of a longer time period would permit the examination of the effects of higher-level questions on pupil achievement over time.

The relationship of sex to pupil response to higher-level questions was not clarified by this study. Further exploration using different grade levels and content might provide additional insight. The analysis of the responses at each level of questions as related to the sex of the pupils might aid in understanding the relationship of this variable to achievement.

Further investigation of the differences in social studies achievement demonstrated by pupils from similar socio-economic backgrounds but from different school locations is needed. An examination of the ethnic variable compared with school location should be considered. A study of the nature of classroom instruction in urban and suburban schools might provide insight into differences in instructional strategies that affect the pupil's ability to answer higher-level questions. The use of the same defining criteria for socio-economic level but applied to a different metropolitan area would be useful. The selection of different criteria to identify socio-economic level in similar school locations would be a valuable study. The reading ability of the pupils might be used as a blocking variable in a study similar to this one. An exploration of the attention span of urban boys as related to achievement testing would provide further insight into the problem that occurred in this experiment. It remains for the educational researcher through replication, expansion, and manipulation of the variables in this study to confirm and extend the conclusions that have been reached by the experimenter.

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APPENDIX

TABLE I

SUMMARY OF DESIGN*

	Sex			
	Male B_1		Female B_2	
	School Location		School Location	
	Urban C_1	Suburban C_2	Urban C_1	Suburban C_2
Treatment Group A A_1	$A_1B_1C_1$	$A_1B_1C_2$	$A_1B_2C_1$	$A_1B_2C_2$
Treatment Group B A_2	$A_2B_1C_1$	$A_2B_1C_2$	$A_2B_2C_1$	$A_2B_2C_2$
Control Group A_3	$A_3B_1C_1$	$A_3B_1C_2$	$A_3B_2C_1$	$A_3B_2C_2$

*n=10 per cell and 120 for total sample

TABLE II

SOCIO-ECONOMIC CHARACTERISTICS
DESCRIPTIVE OF POPULATION*

Characteristics	SMSA	Urban	Suburban
Median Income	$ 6,896.00	$ 5,956.00	$ 6,632.00
Median School Years Completed	12.20	11.10	11.40
Median Population Per Household	3.02	2.86	2.90
Median Value Per Dwelling Unit	$13,600.00	$10,884.00	$12,300.00
Per Cent White Collar Workers	52.00	41.00	46.00

*Figures taken from the 1960 Census Tracts data

TABLE III

SUMMARY OF POSTTEST SCORES

A_1				A_2				A_3			
B_1		B_2		B_1		B_2		B_1		B_2	
C_1	C_2	C_1	C_2	C_1	C_2	C_1	C_2	C_1	C_2	C_1	C_2
35	39	31	42	36	48	19	29	18	21	22	20
34	49	36	35	31	53	15	44	15	20	17	19
31	39	41	42	26	49	43	47	9	26	14	27
24	45	36	49	23	49	37	43	12	20	20	20
31	52	28	44	15	38	25	44	16	19	16	22
34	38	40	47	17	44	32	37	11	23	16	19
27	47	26	39	19	33	38	39	19	24	18	28
35	47	28	38	17	39	41	33	20	24	24	27
40	44	37	50	28	41	42	50	13	25	24	22
34	50	24	43	31	40	36	40	13	18	21	31
325	450	327	429	243	434	328	406	146	220	192	235

TABLE IV

ANALYSIS OF VARIANCE

	Source of Variation	Sum of Squares	d.f.	Mean Square	F
A:	Treatment	7841.41	2	3920.71	121.95**
B:	Sex	81.67	1	81.67	2.54
C:	School Location	3131.41	1	3131.41	97.40**
AxB:	Treatment x Sex	101.59	2	50.80	1.58
AxC:	Treatment x School Location	308.05	2	154.03	4.79*
BxC:	Sex x School Location	232.40	1	232.40	7.23*
AxBxC:	Treatment x Sex x School Location	124.09	2	62.05	1.93
Error:	Within treatments	3472.50	108	32.15	
	Total	15293.12	119		

*p < .05 **p < .01

TABLE V

NEWMAN-KEULS TEST

	X_3	X_2	X_1
X_3 = 19.83	____	15.45**	18.45**
X_2 = 35.28		____	3.00*
X_1 = 38.28			____

*p < .05 **p < .01

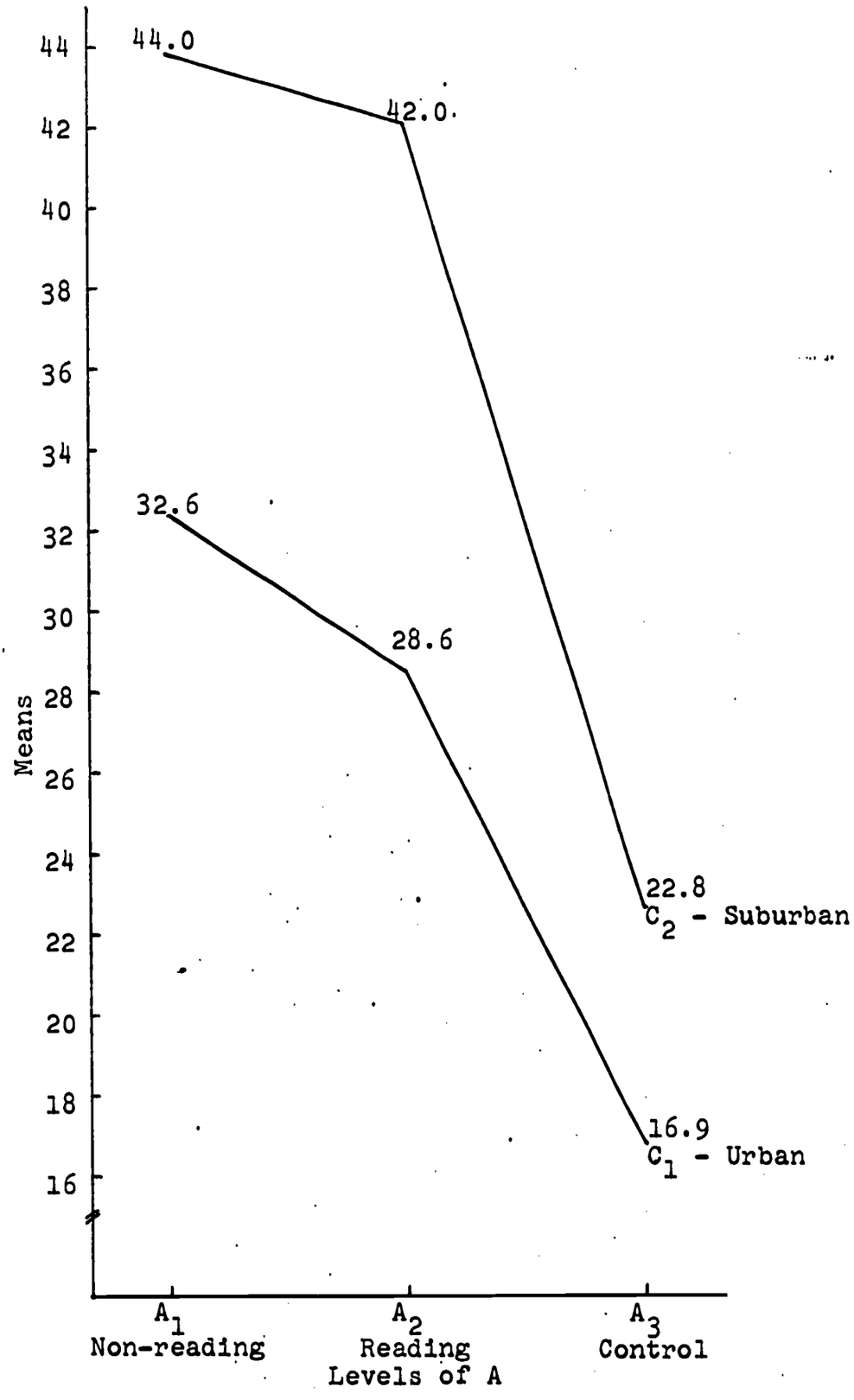

PLATE I. Means for levels of C at each level of A

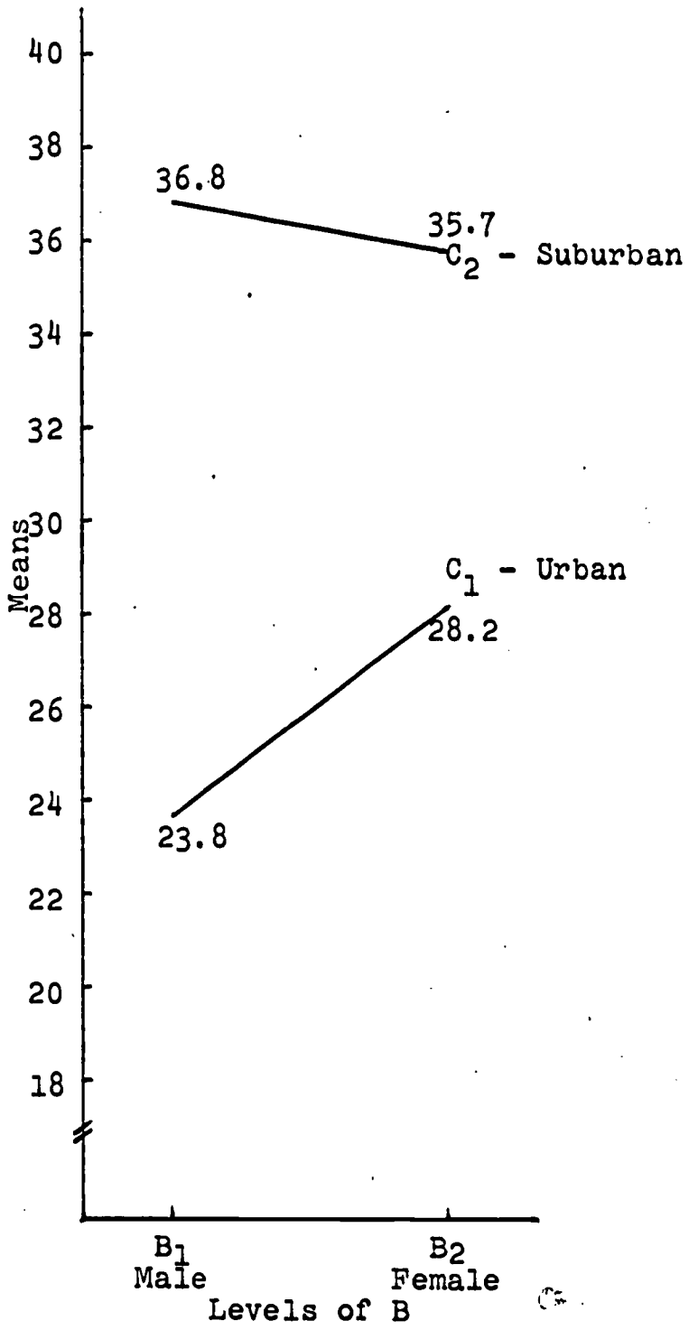

PLATE II. Means for levels of C at each level of B